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ABSTRACT

Total Energy Management (TEM) is a unified, planned approach to reducing the energy use and costs of an individual school or school district. The program increases energy awareness and improves school energy efficiency through: (1) careful energy accounting; (2) changes in operations and maintenance procedures; (3) modifications in the building envelope and its energy using systems; (4) energy management; and (5) curricula with an energy focus. Examples of how each of these TEM components have been implemented in Minnesota are provided. Steps that other schools or school districts can follow or adapt to develop their energy saving potential are also provided. These steps focus on initial efforts, development, implementation, and evaluation. A list of capital conservation investments frequently recommended in maxi-audits, a list of responsibilities for the various team members involved in TEM, and a description of resources for TEM are included. (JN)

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Total Energy Management for Minnesota Schools

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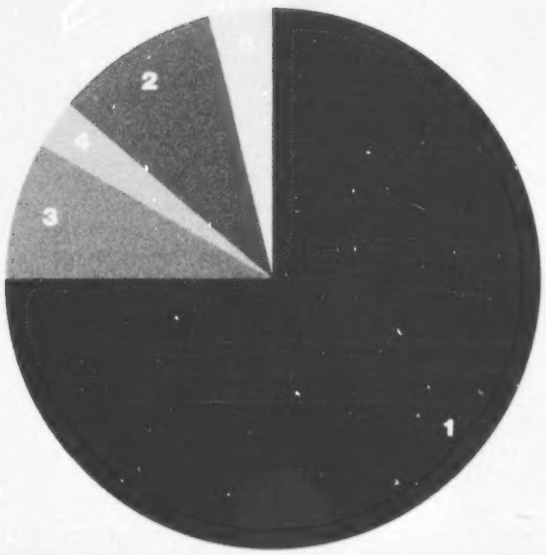
Energy Consumption Pattern for Minnesota Schools

1	Space Heating	75%
2	Lighting	11%
3	Air Conditioning	9%
4	Domestic Hot Water	2%
5	Other	3%



Total Energy Management for Minnesota Schools

Education has always been a priority for Minnesotans. We pride ourselves on our schools, and support them strongly. But in spite of the fact that most communities need fewer school buildings now than they did in the past three decades, schools are costing Minnesota communities more to run. The major reason for this is, of course, inflation, which has been grabbing at everyone's checkbook. But energy costs are rising even higher than inflation.

Most of our schools were built when energy costs were not a major consideration. As a result, they were not built for energy efficiency. They are expensive to run now. Minnesotans paid $110 million in 1981 to heat, light, and cool their school buildings and to run the appliances and equipment in them. The 2800 school buildings in this state – elementary and secondary schools, post-secondary schools, colleges and university buildings – used 23.1 trillion Btu of energy in 1980. This is enough energy to keep the city of Duluth running for a year.

Although the amount of energy used by Minnesota schools has held fairly steady for the last four years, the cost of this energy has increased 25 percent. Schools have absorbed this increase into their bulging budgets, at the expense of other budget items and of the taxpayers who support them. These costs will not be leveling off in the near future. In fact, it is projected that energy costs will increase 150 percent by 1990.

School administrators and school boards have to deal with these rising energy costs as they struggle with their budgets. Parents and other community residents must deal with the impact of the energy price squeeze as they face bond issues, rising taxes, and school closings. To keep costs down, building operators must come up with ways to run their schools more efficiently. The entire school community, including students and teachers, must recognize the energy issues that face Minnesota, and the impact these have on their own school on their daily energy use.

Energy costs are taking a bigger bite out of the school budget.

The energy used by a typical Minnesota school building could provide heat and electricity for 50 average sized homes. With an annual energy consumption of about 110 thousand Btu per square foot, total fuel use by an average school is 6,894 million Btu each year. This is equivalent to about 1200 barrels of crude oil. In 1981, energy costs for Minnesota schools averaged $53,300 per building. Projected increases in fuel prices due to inflation, deregulation, and other factors could bring this cost to almost $132,000 by 1990.

1981 Average Energy Cost in Minnesota Schools

Building Size: 74,300 sq. ft.
Annual Fuel Consumption: 6,894 MMBtu/yr.
Annual Electrical Use: 365,950 kWh/yr.
Energy Use per Square Foot 109.6 MBtu/sq. ft.
1981 Energy Cost $53,300

Not only are school energy costs rising, they are also taking a larger chunk of the school budget. The portion of the budget pie serving energy needs has tripled in the past ten years for Minnesota schools, from 2 percent to 6 percent. Although 6 percent does not seem like much, it represents other school needs that must go unmet. Hefty energy costs compete with books and supplies, new learning materials, special programs, and salaries – and they usually win.

Three-fourths of the energy bill for Minnesota schools is for space heating. Other major fuel uses by schools are lighting (10 percent) and air conditioning (9 percent). Because of greater use of electrical equipment and longer hours due to extra-curricular activities, secondary schools use almost 50 percent more electricity than elementary schools. Finding more efficient ways to meet heating, lighting, cooling and transportation needs can keep energy costs under control.

During the '80-'81 school year, energy expenditures in Minnesota public school districts averaged about $80 per pupil unit. Many school districts had much lower averages. One out of ten districts averaged less than $55 per pupil unit. On the other hand, one fourth of the districts averaged over $115 in energy costs per pupil unit.

Accounting **The Hopkins School District has used an energy accounting system since 1975 to track energy use and costs, compared to degree days, for each school building. Every head custodian receives an energy use report on a monthly basis. Energy accounting has allowed the district to pinpoint areas of potential savings and to measure actual reductions in energy use after taking conservation steps. For instance, at Lindbergh High School an electrical demand controller was installed and reduced electrical demand by 27 percent, and lighting levels were reduced from 100 to 50 foot candles. These measures cost $9,000 to implement and saved $60,500 in 3½ years.**

Schools can reach their energy saving potential.

Energy use in Minnesota school buildings can be cut an estimated 30 percent. These savings were projected through the analysis of 185 school and local government buildings in the state. Realizing these potential savings through improved energy efficiency is increasingly important as state and federal aid to schools declines, and salaries and operating expenses mushroom due to inflation. Energy efficiency means simply that required functions are being performed using the smallest possible amount of energy. The aim is to conserve our energy resources, save money, and still meet our schools' needs.

Energy use can be reduced in any building simply by changing how the building is used and maintained. Further reductions in energy use will occur by modifying the building itself and making changes in its lighting, heating and other energy using systems. Additional savings can come from cutting energy use for transportation. Much energy conservation can be achieved within the operating budget, through efforts of school staff. Other projects that require a capital investment will result in long-term savings in the operating budget.

As energy costs rise, homeowners and businesses have seen conservation as an investment with a good payback. Schools, too, are discovering that cutting energy use is critical to alleviating painful budget squeezes. Conservation can save our schools money that is critically needed for educational concerns.

School energy consumption also can have a broader impact. Schools are an important resource within a community, and often take a leading role in community projects. A commitment to cost-effective operation by schools can spur others in the community to examine their own energy use. The education of students about energy issues can produce a community of citizens, who use the nation's energy resources more thoughtfully and carefully than we have in the past.

Total Energy Management curbs energy costs.

Schools can reach their energy saving potential through careful energy management encompassing all aspects of school operation. The goal of such a total energy management approach is, of course, to reduce school energy use. Toward this end, energy management has three main objectives:

to develop an "energy consciousness" among school staff and students,

to ensure that energy implications are a high priority in school decisionmaking,

to operate each school at its peak energy efficiency.

Total Energy Management, then, is a unified, planned approach to reducing the energy use and costs of an individual school or a school district. It increases energy awareness and improves school energy efficiency through careful energy accounting, changes in operations and maintenance procedures, modifications in the building envelope and its energy using systems, transportation management, and curriculum with an energy focus.

Operations & Maintenance/Building Improvements
Onamia Elementary School, a Mille Lacs county school with over 400 students, implemented operations and maintenance recommendations identified in a mini-audit for a projected savings of 5-10 percent and is implementing more extensive energy conservation measures identified in a maxi-audit for an additional 16 percent savings. These measures include installing a controller to reset hot water heating system water temperature according to outside temperatures, reducing outside air intake, and modifying the boiler. The audits and conservation measures cost a total of $32,800 in state, federal and school district funds and will save an estimated $9,200 a year (based on '79/'80 fuel costs).

Total Energy Management Components

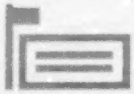
Energy Accounting. Where do energy dollars go? Until schools have an accurate picture of how they are using energy, it is difficult to begin to cut costs significantly. Energy accounting is a tool for ongoing monitoring of schools' energy use and costs. It provides the basis for making decisions about modifying school energy consumption. An energy accounting system helps save money by:

identifying where energy waste exists,

providing information for budgeting and for choosing cost-effective improvements in operations and buildings,

showing which conservation actions produce the most energy savings for the least cost.

Operations and Maintenance. Up to a 15 percent reduction in energy use in schools is possible for little or no capital cost. Changes in operating and maintenance procedures save energy through more efficient use of a building and its systems. Energy can be saved by modifying the use of doors and windows, using lighting more efficiently, reducing water use and temperatures, lowering building temperatures, and maintaining heating, ventilation, and air-conditioning systems. Energy savings that can be achieved for little or no cost can be identified through a *mini-audit.* This is a building inspection to assess the building's condition and energy use. The mini-audits already completed by the majority of Minnesota schools can be used as a starting point for setting up operations and maintenance programs for increased efficiency. Training for building engineers and custodial staff in energy-efficient operations is an important part of Total Energy Management.



Building Improvements. A more detailed engineering analysis of a building and its energy using systems, called a *maxi-audit,* identifies more substantial conservation measures that would be cost effective for each particular building. Such measures may include changes in the building shell itself and substantial modification of mechanical equipment, lighting, and heating, ventilation, and air conditioning systems. Although these retrofit measures may require a significant capital investment, they would return this investment in energy savings in a period of years. Two-thirds of Minnesota schools have completed maxi-audits. Current audit results should be used to develop a capital improvements plan for improved building efficiency.

Transportation. Transporting students to and from school is another escalating school expense. There is potential for cutting fuel costs through well planned routing and scheduling, regular vehicle maintenance for maximum efficiency, and fuel efficient driving habits. Careful accounting can track energy use for each vehicle and bus route to suggest areas for cutting gasoline consumption. School business officials, drivers and mechanics together can cut school energy costs for transportation and can plan ahead for possible fuel emergencies.

Energy Education. Energy education increases students' knowledge about energy resources, how they are used, and what the implications of this are. A broad range of energy education learning activities are now available and can be inserted into existing courses in all subject areas in both elementary and secondary levels. Students can use their school building as a "lab" — monitoring its energy use and experimenting with ways to reduce energy consumption. Minnesota-specific curriculum resources are available to help students understand how energy issues affect their state, community, and families.

Low and No Cost Conservation Measures Frequently Recommended in Mini-Audits

Doors and windows

Adjust door closers, keep exterior and vestibule doors closed
Encourage staff to use window drapes to maximize solar gain
Caulk exterior cracks, weatherstrip doors and windows
Repair broken/cracked windows and closing latches

Heating, ventilation, air conditioning

Adjust/calibrate HVAC controls
Reduce space temperature during occupied periods to 65-68 degrees
Reduce the fresh air ventilation rate during occupied periods to minimum code or comfort requirements
Reduce space temperature to 50-55 degrees during unoccupied periods manually or through use of night set-back controls
Turn off ventilation system during unoccupied periods through use of manual switches or time clocks
Maintain HVAC components: filters, steam traps, dampers, etc.

Lighting

Turn off classroom lights when not in use
Replace existing lamps with high efficiency/reduced wattage lamps
Remove or disconnect lights in overlit areas

Kitchen, laundry, washrooms

Adjust/maintain controls of kitchen and laundry equipment (dishwashers, exhaust hoods, etc.) and turn off when not in use
Reduce the temperature of domestic hot water
Install flow restrictors in faucets and shower heads

Maintenance

Begin a preventative maintenance program and schedule
Schedule the use of the building to reduce energy use
Clean and adjust controls of electrical distribution system
Align/lubricate motors and adjust belt tension
Test and adjust boiler for maximum combustion efficiency

What's the best route for reaching your energy saving potential?

There are several ways that schools can implement Total Energy Management to reach their energy saving potential. Each school or district can develop a process tailored to fit its own needs. The organizational structure for an overall energy education and management program can range from simple, with one staff person given responsibility for all aspects of the program, to complex, with several committees overseeing the various components of the program.

Whatever structure a school chooses for carrying out total energy management, the program will be effective only with the ongoing commitment of those who use and maintain the school buildings and vehicles and through the active support of the district's leadership. Some kind of team approach, then, is a good model for the coordination of energy education and management activities. The organizational chart illustrated here is one example of how a school might organize to save energy.

Energy Education and Management: A Model Process.

Every school and district is unique, but there are common elements and basic procedures that go into a successful energy education and management program. The following steps outline the process any school can follow or adapt to develop their energy saving potential.

Gain school board and administrative commitment.

The school board should establish a policy supporting total energy management and administrators at all levels must become committed to the program.

Initiation

Designate an energy coordinator. One person, committed to energy management and capable of organizing and leading a working team, needs to be designated to spearhead the program and given authority to implement it.

Establish an energy team. This team should represent the range of people who affect and are affected by school energy use, including administrators, teachers, building engineers and custodians, students, food service and transportation personnel, and parents.

Assess district's (or school's) energy status. Review school energy records, any previously done audits, existing energy education programs, and past and current conservation efforts. Determine the need for updating or having new building audits done and the need for activities in the areas of accounting, curriculum, transportation, and building operations.

Determine goals and priorities and develop a work plan. Based on identified needs, decide goals and activities for a one or two year period. This work plan should include task assignments and timelines.

Allocate necessary resources to reach goals. Budget staff time, materials, and training funds necessary to carry out the work plan.

Development

Develop energy accounting system. Adopt or develop a manual or computerized accounting system to track energy use and costs on an ongoing basis.

Conduct energy audits of buildings. Mini- and maxi-audits can identify cost-effective ways to cut energy use. An architectural or engineering consultant may be needed.

Develop staff's energy IQ. Train appropriate staff in energy accounting and building operations for maximum efficiency, and introduce faculty to energy curriculum resources.

Develop a capital improvements and financing plan. Based on building audit recommendations, determine retrofit priorities, timetable, and funding strategy.

Prepare plan for fuel emergency. Develop a brief plan for reducing transportation consumption in the event that a fuel emergency is declared. Anticipated deadline for these required plans is April 1984.

Implementation

Incorporate energy education into curriculum. Teachers can use available K-12 learning activities for a range of subject areas, develop their own, and use the school itself as an energy lab.

Incorporate energy efficient operations and maintenance practices. These should be based on mini-audit recommendations and will have minimal implementation costs.

Implement energy accounting system. Use energy accounting to provide monthly and annual energy use and cost reports for each building.

Carry out major retrofit projects. Based on maxi-audit recommendations, energy efficiency improvements can be made in the building envelope and its energy using systems.

Make changes in routing, vehicle maintenance that could cut energy use. Energy accounting can suggest areas for cutting transportation costs.

Evaluation

Assess results of energy management. Energy accounting will measure reductions in energy use. The team should determine whether the goals they established were met.

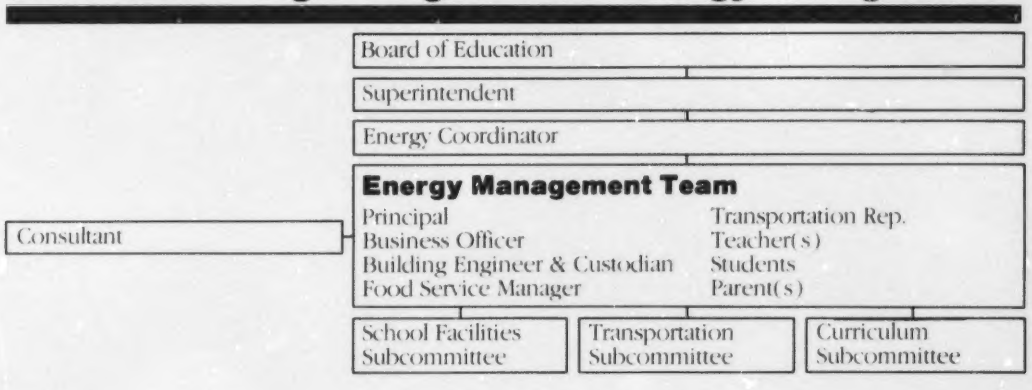
Building Improvements/Operations & Maintenance The Red Wing School District completed retrofit projects on its junior and senior high schools in the summer of 1981 that will be paid for in energy savings in less than three years. Twin Bluffs Jr. High, a 1970 structure housing about 700 students, had electricity as its sole energy source and therefore had high energy costs. Measures taken to reduce these costs included modifications to the pool's air and humidity controls, installation of a gas-fired heater for domestic hot water and the pool, heat recovery modifications to the cooking range hood, a switch to mercury vapor lighting fixtures in some areas, the installation of photo cells to control lights in limited use areas, and the addition of a microprocessor to control energy use. The $54,870 cost of these projects will result in savings of $19,250 a year, which represents 20 percent of the school's energy costs. A $15,250 project at Central High School, with about 800 students, included the installation of a night temperature setback control, a gas-fired heater, and fluorescent lighting to replace incandescent lighting. These measures will save 11 percent of the building's energy costs, or $5400 annually.

Transportation Medicine Lake Bus Company, a school transportation contractor, has taken several steps to cut fuel use, managing to keep 1981-82 costs equal to those of the previous school year, negating cost increases expected due to inflation. The major factor in these savings was an increased use of diesel buses. The company is also in the process of switching to radial tires on all of its buses. Gas pumps operated by computer card provide fuel use data for each bus and serve as a check against pilferage of gasoline, as well as an alert to reductions in fuel efficiency in any vehicle. A computerized program also tracks maintenance costs per mile. The company has monitored driving habits to stop the practice of leaving buses running in the winter when they are not in use, and is experimenting with the use of propane.

Modify energy plan. Total Energy Management is an ongoing process. After initial major goals are met, school energy savings must be maintained, and new areas for savings identified.

Recognize accomplishments. The efforts of schools, plant managers, teachers and students and others should be applauded and the community made aware of the achievements made by their schools in cutting their energy use.

One Model of Organizing for Total Energy Management



Capital Conservation Investments Frequently Recommended In Maxi-Audits

Measures	*Cost of Measure per Million Btu Saved*
Building envelope	
Install additional roof insulation	$ 6.31
Caulk and weatherstrip exterior cracks	0.72
Install storm windows or thermopane glass	4.49
Reduce window area with insulated wall/panel	3.71
Heating, ventilation, air conditioning	
Reduce the amount of cold outside ventilation air	0.86
Install time clocks or night set-back on HVAC equipment	0.54
Install or replace thermostats to eliminate overheating	1.88
Install or modify HVAC Controls	1.03
Add economizer/enthalpy controls to allow the use of outside air for summer cooling	1.25
Add heat recovery equipment to HVAC system	1.04
Lighting	
Add multiple light switches	7.45
Replace incandescent lighting with fluorescent fixtures	5.97
Install energy efficient lamps and ballasts	8.62
Mechanical equipment	
Install a separate domestic hot water heater so boiler can be shut off during the summer	0.27
Replace electric motors with high efficiency units	3.68
Add flue damper to boiler/domestic hot water heater stack	1.60
Replace oil boiler burner with efficient unit	1.43
Install solar domestic hot water system	15.34

Energy Costs (1981 Commercial Rates)	
Fuel Type	***$/Million Btu***
Natural Gas	$ 4.00
Natural Gas—decontrolled	6.06
#2 Fuel Oil	8.22
#5 Fuel Oil	5.54
Electricity	13.92

The value of a particular conservation measure can be roughly judged by comparing the estimate of the cost of the measure per million Btu saved to the cost of the energy that this measure would conserve. If the cost of the measure is lower than the cost of the energy, it is generally a good investment. For example, adding multiple light switches may cost $7.45 per million Btu saved, but it saves electricity that cost $13.92 per million Btu.

Team members carry the school to its energy goals.

What Total Energy Management boils down to is people. People who care enough to work together to make their school operate efficiently. Their goal is to save money to use for what counts—educational programs for our young people. Every team member has a specific responsibility for helping the school meet this goal.

Energy Education **Third graders at Parker's Prairie Elementary School used classrooms for grades one through four as labs to study school lighting habits, and established an experimental lighting conservation plan in one classroom and compared its lighting use to that of a "control" classroom. Also, with the assistance of the local power company, they compared the use of equivalent banks of fluorescent and incandescent lights in two classrooms. The students shared their findings with the other students, faculty, administrators, parents, and the school board.**

Eagle Bend High School tenth graders conducted an experiment to compare the sun and wind as renewable energy sources for space heating. They designed and built a solar panel and a wind electric generator and used each to heat a room in the school. The heat gain from each source was monitored for a month and compared. The students found their solar heat exchanger to be a more effective heat source than their wind electric generator.

Team Member Responsibilities

School Board and Superintendent

Establish policy.
Allocate funds for energy conservation and make capital improvements decisions.

Energy Coordinator

Coordinate the implementation of all conservation activities.
Report to superintendent and school board.

Principal

Set the tone of energy conservation in the school.
Serve as a leader of his/her school's energy management team.
Represent program to teachers, parents and community.

Business Official

Keep accurate records of energy expenditures and projected savings through energy accounting.
Monitor energy use closely for an early detection of energy inefficiencies.

Energy Consultant

Collect and analyze audit data and prioritize recommendations.

Maintenance Engineer and Custodian

Conduct or assist consultant with building energy audits.
Recommend and carry out modifications in operating and maintenance procedures.
Inform, train, and motivate custodial and food service staff regarding role in cutting energy use.
Act as an early warning system for energy waste in the school building.

Transportation Representative

Recommend and carry out changes in routing, vehicle maintenance, and driving practices.

Teachers

Review curriculum and make recommendations for incorporating energy education into classrooms.
Provide faculty input regarding classroom energy use.

Students

Provide input from students about energy use and ideas for enlisting student cooperation.
Assist in implementing energy conservation activities and communicating results with community.

Parent Representative

Provide community feedback about school energy conservation.
Communicate program goals, steps, and results to the community.

The bottom line is always money.

Although the capital investment required to implement many energy conservation measures can be substantial, so are the potential savings. Without an understanding of this energy saving potential, schools have little motivation to make such an investment when other areas of their education budget are also in need of funding. There are two problems. First, in most cases it takes money to save energy and money is very tight. Second, energy price increases can wipe out any energy cost savings from conservation projects and hide actual savings of costs that would have occurred without conservation. It is hard to see how much has been saved because the energy bills probably won't get smaller.

A total energy management program can help schools estimate and "see" their energy savings. It can help them understand why it is important to invest now to save in the future.

One way of looking at the benefits of an investment in energy conservation is to consider it as a loan from taxpayers that will be paid back with tax money saved in the following years. After the payback period, the continuing savings from these measures is interest on this loan. For example, in the case of a school investing $31,000 in retrofit projects to cut energy use by 24 percent, the return on this investment in ten years would be $144,373 in energy saved (1981 dollars).

Schools can have some control over their energy expenses by reaching for their energy saving potential. Through Total Energy Management, schools can make a wise investment for their future.

Total Energy Management at work: Anoka-Hennepin School District #11

The Anoka-Hennepin School District has made energy conservation a top priority. With the strong support of the school board and superintendent, the district has carried out a variety of programs to increase the energy efficiency of their buildings and operations and increase the energy awareness of their students. For a year and a half an ad hoc energy committee appointed by the board, with representatives from the administration, buildings operations and custodial staff, faculty, and community, assessed the district's energy situation and made plans to reduce its energy use. Significant changes have been made in the areas of building operations and retrofit, transportation, and curriculum. The school district estimates that it is using 35 percent less energy now than it would be if no conservation measures had been taken.

Buildings. Over the past ten years the district's Buildings and Grounds Director has directed a comprehensive effort to reduce energy use in each building. This energy management program has involved: 1) completing mini and maxi audits on the buildings and developing conservation plans, 2) getting all existing systems operating properly, 3) retrofitting existing equipment for greater efficiency, 4) providing training and written guidelines regarding efficient operations and maintenance for custodial staff, and 5) planning for major building retrofit such as window renovation and adding insulation in roofs when they are replaced. During the '81-'82 school year, for instance, a switch to fluorescent lighting in elementary gymnasiums saved an estimated $1500 per building. The conservation measures have not reduced, and some have even increased the comfort level of the buildings' users.

An accounting program documents energy use; fuel use can be compared between schools and years on a Btu/sq. ft./degree day basis and on a per pupil basis. Since 1968, each school building principal and custodian have received annual fuel use reports. These reports have shown, for example, that two-thirds of the buildings had reductions in fuel use unrelated to weather in 1980-81 from the prior year. Three-fourths of the schools reduced their electricity use in 1981-82 from 1980-81.

The district credits its energy management program for a 24 percent drop in the amount of energy used to heat its buildings in 1981-82 from its energy use in 1976-77, a school year with a comparable number of degree days. In addition, electricity use overall was down 9 percent in three years.

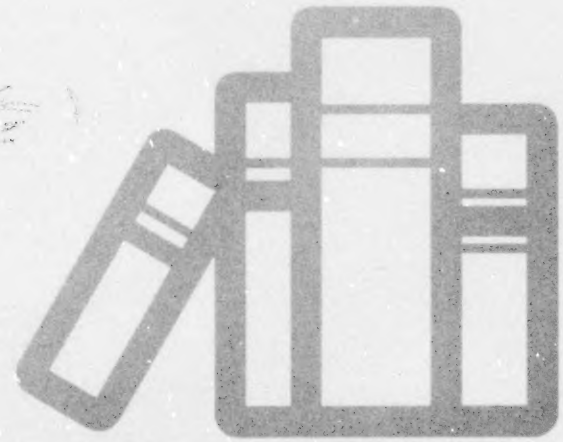
An energy conservation plan is prepared for each building by the school district annually to review past conservation measures and outline projects planned for the coming year and those under consideration for future years. The initial focus of the plans was implementation of measures with a five year payback or less. Remodeling jobs with a longer payback are part of the long range program.

Building retrofits are financed through the capital expenditures budget of the school district. Because of this, plans for building efficiency improvements do not compete with general fund items. However, the resulting energy savings will save general fund dollars in years to come. Renovations have been spread out over a number of years, and this has eased the impact of their expense. In addition, the school district has taken a long term view of their energy conservation investment, realizing that their buildings will be used for several decades more, fuel prices will continue to rise, and accrued savings from avoided energy costs will offer a good return on their investment.

Transportation. In the face of escalating gasoline costs, the district has also managed to reduce the fuel used for busing students. After a careful examination of their routing needs, the district eliminated 7 percent of their buses and cut out 12 percent of their stops. Bus drivers have been directed to stop the costly practice of leaving bus engines running while buses are not in use. In addition, the district has convinced their contract busing service to begin to purchase more fuel-efficient diesel buses. As a result of these efforts, over 65,000 gallons of gasoline were saved during the 1981-82 school term. The district is now developing a computerized routing service to further increase the efficiency of their transportation operations.

Curriculum. Every secondary science course examines some aspect of energy; the district has sponsored a training workshop for secondary science teachers on energy education as well. In addition, two teachers received a grant from the Council on Quality Education to develop a pilot course called "Shelter and Energy Alternatives," an interdisciplinary elective now offered to eighth graders in the district. The curriculum will be available to schools throughout the state. Several other teachers have incorporated energy education into their curriculum. For instance, a window replacement energy retrofit at one building provided the impetus for several classes to explore energy issues. Elementary teachers are being encouraged to integrate energy concepts within their existing study areas.

The Anoka-Hennepin School District has an ongoing commitment to energy conservation. The leadership and motivation of a core of staff members is leading to conservation action throughout the district, and is resulting in reduced energy use and an increasing energy awareness among staff and students.



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Resources For Total Energy Management.

Energy Accounting Procedure Manual for Local Governments and School Districts. This detailed manual, plus an Apple II Energy Accounting software and manual, is designed to help administrators learn and implement energy accounting. Contents include energy recordkeeping forms and instructions, budgeting for energy costs, cost payback information on various conservation measures and methods for analyzing energy information to use in decisionmaking.

Energy Management Program for Building Managers, Supervisors and Operators. This performance oriented, modular training course can be scheduled for schools and districts and tailored to fit the needs of their building management staff. Modules cover conducting an energy audit, planning for improved efficiency, and specific operations and maintenance practices that can cut energy costs. Technical workshops on boiler operation and maintenance, steam traps and steam systems, lighting systems, and pneumatic temperature controls are available through Area Vocational-Technical Institutes.

Institutional Building Grants Program. In the past federal grants have been available through the state to enable schools to conduct energy audits and to carry out energy conservation measures. Schools will be notified if state or federal grant money becomes available in the future.

Special Purpose Capital Expenditure Levy Law. Schools now have the opportunity to raise revenue through a levy of $25 per pupil unit or two mills, whichever is less. Proceeds from the special levy go into a district's capital expenditure fund and can be used to help pay for major energy conservation improvements.

Fuel Emergency Planning Workbook for Schools. This manual assists schools in developing a transportation plan for use in case of a fuel shortage.

Energy Education Curriculum. The State Department of Education and the Energy Division have developed a range of K-12 learning activities and teacher resources for almost all subject areas. In addition, there is a teacher handbook and an audiovisual presentation on Minnesota's energy picture.

Educational Cooperative Service Units (ECSUs). Each area ECSU has guidebooks and planning tools from other states to assist with Total Energy Management planning. Staff can answer questions and refer to other resources.

For more information on these resources and assistance in developing your school's Total Energy Management program, contact the Energy Division of the Department of Energy, Planning and Development:

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